

Q1: Research Questions

- Cisplatin is a platinum-based chemotherapy that forms adducts in DNA
 - Primary form of cancer treatment; Cisplatin resistance is major treatment limitation
- Biomarkers are important for condition diagnoses, predicted outcomes, and targeted personal treatments
 - Identifying more biomarkers can make chemotherapy and other treatments more effective, and ultimately increase survival rates
- Over 154,000 Americans develop colon cancer every year with rising numbers in young people
- Over 226,000 Americans develop lung cancer every year;
 - Most common cancer diagnosed worldwide AND the most deadly
- Research question:** Are genes GATA4, FOXD2, ZNF558, RNF8, NR5A1 biomarkers for Cisplatin treatment in colon or lung cancer cells?

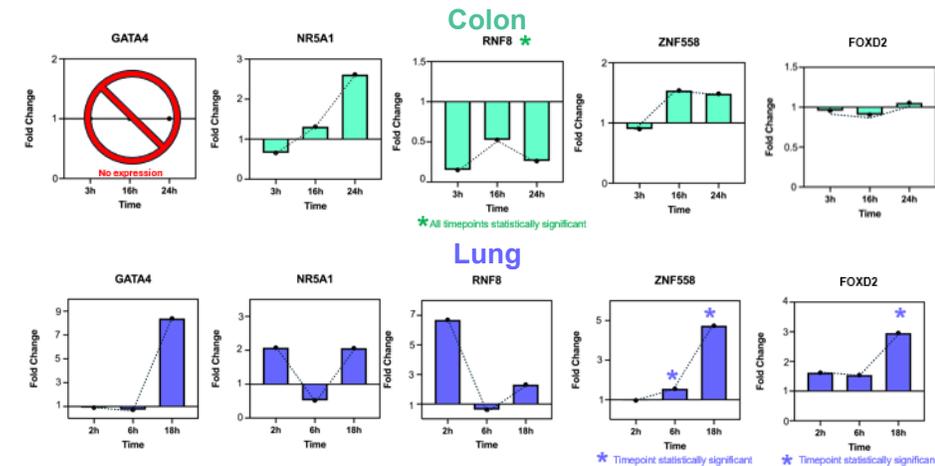
Q2: Project Design

- Identified 5 genes of interest where:
 - Cells resistant to Cisplatin treatment did not change by more than 0.1 on y-axis & cells sensitive to Cisplatin treatment had an incline then a decline
- Thawed cDNA for each cancer (Cisplatin, control); for each timestamp, diluted cDNA (1ul) and water (39ul), 12.5ng/ul, combined Primer (19.3ul) and Master mix (193ul)
- Placed 96 well tray in qPCR machine for amplification, measurement
- Used $\Delta\Delta$ CT formula to determine fold change (% increase/decrease)
- Conducted t-test analysis to determine if results statistically significant
- Utilized prior data of gene expression in Cisplatin treated blood cells to interpret trends of sensitivity or resistance

Q3: Data Analysis

- Results identified more potential biomarkers in colon cancer than lung cancer**

- In colon cancer cell lines, ZNF558 and RNF8 are potential sensitivity biomarkers and FOXD2 is a potential resistance biomarker ■ Patterns of expression aligned across all timepoints



- Potential patterns of sensitivity or resistance were observed in lung cancer cell lines across 2 timepoints
 - FOXD2 and GATA4 aligned with potential Cisplatin resistance, ZNF558 with potential sensitivity

Q4: Interpretation & Conclusions

- FOXD2, ZNF558, & RNF8 in **colon cancer** are potential biomarkers
 - Cisplatin chemotherapy is less likely to be effective in patients with patterns that follow FOXD2 gene expression ■ other forms of treatment – e.g., radiation, other chemotherapies, surgery – may be more effective
 - Cisplatin chemotherapy is more likely to be effective in patients with patterns that follow the ZNF558 or RNF8 gene expression
- FOXD2, GATA4, & ZNF558 in **lung cancer** aligned with potential patterns of sensitivity or resistance across two of three timepoints
- Comparing across various cancers allows for observation of varying results/patterns
- Future work could further investigate potential biomarkers identified in this research, evaluate how genes are expressed in other cancers, or research effects of different cancer treatments on gene expression